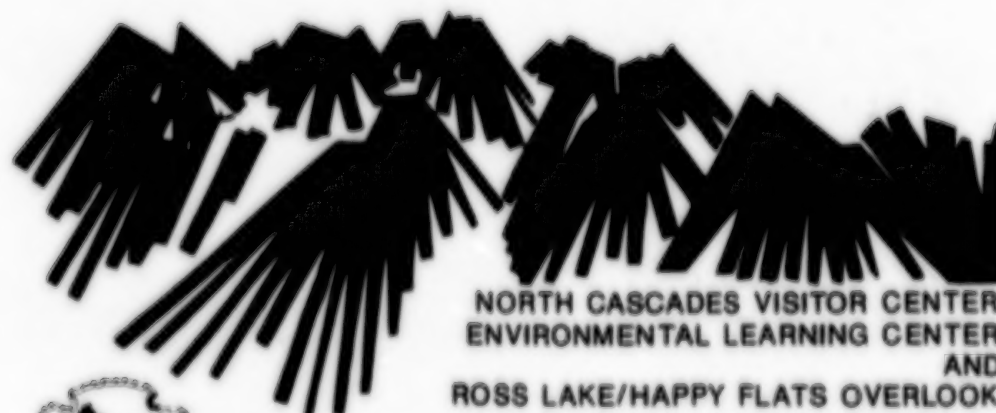


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environmental assessment



NORTH CASCADES VISITOR CENTER
ENVIRONMENTAL LEARNING CENTER
AND
ROSS LAKE/HAPPY FLATS OVERLOOK



NORTH CASCADES
NATIONAL PARK / WASHINGTON

H9w

COMPLETED

May 5, 1989

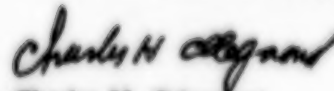
Dear Friends of North Cascades National Park:

We are pleased to present the environmental assessment for the North Cascades Visitor Center / Environmental Learning Center and Happy Flat / Ross Lake Overlook, North Cascades National Park, Washington.

Two alternatives are analyzed in this document -- (1) No action and (2) Construction of a visitor center and an associated environmental learning center along Washington State Route 20 (North Cascades Highway) on the west side of the Ross Lake National Recreation Area near the town of Newhalem, Washington, and the construction of an overlook / interpretive display on the east side of the National Recreation Area adjacent to State Route 20 overlooking Ross Lake. Several other alternative locations for a visitor center / environmental learning center were considered but were rejected during the preliminary review stages.

We welcome any comments you have on this proposal. Comments will be accepted until June 12, 1989. Please send them to:

John J. Earnst
Superintendent
North Cascades National Park Service Complex
2105 Highway 20
Sedro Woolley, WA 98284



Charles H. Odegaard
Regional Director
Pacific Northwest Region

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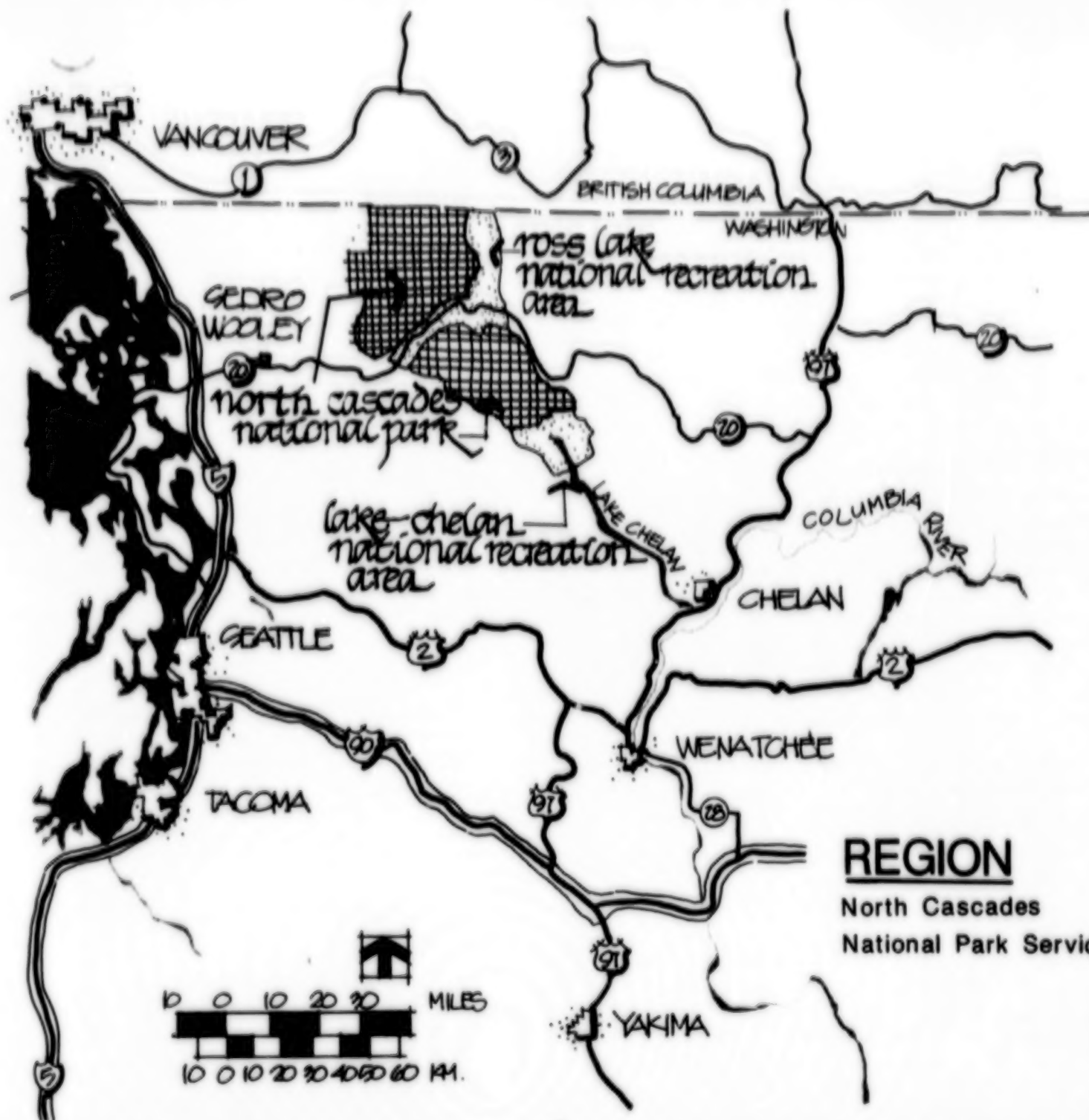
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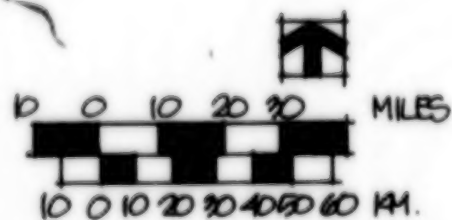
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REGION

North Cascades
National Park Service Complex



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INTRODUCTION

The actions proposed in this assessment consist of: 1) the construction of a visitor center and an associated environmental learning center along Washington State Route 20 (North Cascades Highway) on the west side of the Ross Lake National Recreation Area near the town of Newhalem, Washington, and 2) the construction of an overlook / interpretive display on the east side of the National Recreation Area (NRA) adjacent to State Route 20 overlooking Ross Lake.

The Ross Lake NRA is a portion of North Cascades National Park Service Complex (henceforth referred to in this document as "North Cascades" or "park complex") and is administered by the U. S. Department of Interior, National Park Service (NPS). The NPS office administering the North Cascades is located in Sedro Woolley, Washington.

On August 10, 1987, Congress passed Public Law 100-85 dedicating North Cascades National Park to the late Senator Henry M. Jackson "...in recognition of his leadership in establishing the North Cascades National Park, his outstanding contributions to the National Park System, the National Wilderness Preservation System, and to the protection and preservation of our great natural resources for the benefit of the people of the United States..." (USC 101 Stat. 155). The law directs the NPS to provide such identification by signs, materials, maps, markers, interpretive programs, or other means including an appropriate memorial to Henry M. Jackson.

It is the intent of the NPS to dedicate the visitor center, environmental learning center, and the Ross Lake / Happy Flats overlook to the late Senator.

PURPOSE AND NEED FOR ACTION

The North Cascades, with its high, rugged terrain, presents an awesome and effective barrier to most human travel. For the bulk of park visitors, most of the area within the park complex remains very difficult to reach and understand. The inherent inaccessibility of the park complex has created a great challenge for the NPS to provide for

visitor enjoyment and appreciation of what, to many, is an invisible resource.

North Cascades National Park was established in 1968 "...to preserve for the benefit, use, and inspiration of present and future generations certain majestic mountain scenery, snowfields, glaciers, alpine meadows, and other unique natural features in the North Cascade Mountains of the State of Washington..." (Public Law 90-544). The park complex consists of the park and 2 recreation areas -- Ross Lake and Lake Chelan. Since the conception of the park complex, the NPS has constructed only minor facilities to help visitors take advantage of the abundant scenery and recreational opportunities in the park and recreation areas.

The majority of visitors to the North Cascades enter and exit the park complex on Washington State Route 20. Within the park complex, the highway is constructed through the Skagit River gorge and the Granite Creek valley -- a very low elevation route through the mountains. From the highway, some of the most spectacular and inspirational sights in the park -- the mountain vistas of the Picket Range and the Eldorado Peaks area -- are revealed only in very isolated locations, and then only as glimpses. Many people drive through the park complex and never get out of their cars, and some are not even aware they are traveling through a unit of the national park system.

At present, visitors are usually on their own in planning their trips and experiencing the park and recreation area. For many visitors, this opportunity for self-reliance and discovery is a major part of the attraction of the North Cascades. Some people, however, have expressed an interest in receiving more information and interpretation about the park complex and its resources.

PROPOSED VISITOR CENTER / ENVIRONMENTAL LEARNING CENTER

The NPS would like to take advantage of one of the few locations along State Route 20 with views of the interior of the park, however limited, to provide the visitors an improved experience that will leave

them with a greater understanding and appreciation of the environment of the North Cascades.

In addition, the NPS needs a site that could serve as a single focal point to distribute information to visitors regarding the recreational opportunities, the natural and cultural resources, and the accommodations within the park complex. This would aid park visitors planning their trip through, or their stay in, the North Cascades.

In addition to accommodating the interpretive and informational needs of the traveling public, the NPS proposes to provide an environmental learning center in close proximity to the visitor center to provide an opportunity for more in-depth study of the environment of the park. The NPS feels the need exists to reach out to the school children of Washington State as well as other groups to provide a greater understanding of the area's natural and cultural resource management issues as well as to motivate students to participate actively in solving the environmental problems in the Pacific Northwest.

Because the park complex is more than a two hour drive to major population centers, overnight accommodations would be necessary to house learning center participants while they are in the park.

PROPOSED ROSS LAKE / HAPPY FLATS OVERLOOK

For visitors entering the park complex from the east on State Route 20, there are few opportunities to stop their vehicles and get out and enjoy the spectacular views of Ross Lake and its surrounding mountains. While restrooms and interpretive displays are present along the highway corridor to the east at Washington and Rainy Passes on U.S. Forest Service administered land, there are few other opportunities for these visitors to stop, enjoy, and absorb their surroundings while traveling westward on State Route 20.

The General Management Plan for the park complex states as a primary goal that the NPS "...encourage and help people enjoy their natural surroundings free from the distractions of mechanized equipment and imposing structures" (North Cascades GMP 1988). Towards this goal, the NPS is proposing to construct an overlook,

parking area, interpretive display, a short trail, and restrooms along State Route 20 near the eastern boundary of the park overlooking Ross Lake.

INTERRELATIONSHIPS WITH OTHER PROJECTS AND PLANS

NORTH CASCADES GENERAL MANAGEMENT PLAN

The General Management Plan (GMP) for the park complex was approved by the regional director in June, 1988. It provides broad direction for managing the pristine environments of the park complex as well as the development and management of visitor services and necessary accommodations. The GMP proposes that a new visitor center be constructed on the west side of the mountains that "...will provide an inspirational introduction to the North Cascades intended to help visitors form an appreciation for the natural world they are entering" (North Cascades GMP 1988).

In addition, the GMP directs the NPS to encourage and assist visitors "...to become participants rather than spectators..." in experiencing the park. The GMP also provides direction for developing major interpretive themes for visitors in various locations of the park.

NORTH CASCADES HIGHWAY AND CASCADE PASS DEVELOPMENT CONCEPT PLAN (DCP)

Completed prior to the GMP, this plan was developed to examine possibilities for improved information and interpretation for day visitors to the portions of the park complex in the upper reaches of the Cascade River and along the Highway 20 corridor. Because the DCP was completed prior to the General Management Plan, it has been only partially utilized to develop facilities. Upon completion of the DCP, new facilities were developed at Happy Flats and the Cascade Pass parking area.

COPPER CREEK DAM

Seattle City Light has proposed an additional dam on the Skagit River near Copper Creek, approximately 8 miles downriver from the proposed visitor center site. If built, the reservoir resulting from this dam would flood the Skagit Valley between Newhalem and Copper Creek to an elevation of between 475 to 490 feet. Although the area proposed for the visitor center is well above the proposed reservoir, the inundation could affect access routes to the site from State Route 20.

AFFECTED ENVIRONMENT

EXISTING CONDITIONS

Location and Access

North Cascades National Park Service Complex is located in north-central Washington and extends from the Canadian Border to the northern end of Lake Chelan covering approximately 684,000 acres (see Region map p. 1). The park complex includes North Cascades National Park (504,781 acres), Ross Lake National Recreation Area (117,574 acres), and Lake Chelan National Recreation Area (61,890 acres).

North Cascades is one of three large national parks in Washington; the other two are Mount Rainier National Park to the south, and Olympic National Park to the west and across Puget Sound. The Pasayten Wilderness forms the eastern boundary of the complex; Glacier Peak Wilderness lies along the southwest edge; Mount Baker Wilderness and Noisy-Diobsud Wilderness border the west; and the Lake Chelan-Sawtooth Wilderness borders the southeast. Together these areas comprise more than 1.3 million acres of designated wilderness.

In 1988, the Washington Parks Wilderness Bill designated 634,600 acres of the park complex as the Steven Mather Wilderness. The designation of wilderness includes lands in the park and the recreation areas.

The complex is within a two- to three-hour drive of the rapidly growing metropolitan areas of Puget Sound and lower mainland British Columbia. The majority of park visitors reside in this urban corridor.

From the east and west the park complex is accessible via State Route 20 (see Highway Corridor map p. 5). The highway is open from late spring until early winter, when it is closed by heavy snow and avalanches in the mountain passes between Early Winters and Diablo Lake. More than 90 percent of the visitors to the park complex enter and exit on State Route 20. Lake Chelan affords access from the southern end via private boat, commercial ferry, or float plane. From the north, the park complex is accessible from Hope, BC via a narrow gravel road that ends at Hozomeen near the head of Ross Lake. All other access to the park complex is afforded by trail.

Visitor Use

Recreational use to the North Cascades is highly seasonal, with 86 percent of the total visitation occurring during the months of June through September. In 1988, approximately 652,000 visits were recorded for the park.

Since the completion of State Route 20, visitor use in the park has fluctuated moderately. The visitor use statistics of the last 15 years do not show a trend indicating tangible change. Figure 1 depicts the visitor use figures for the past 4 years. The data is from the NPS Statistical Office, Denver Service Center.

Figure 1
Total Visits, North Cascades National
Park Complex

<u>Year</u>	<u>Total Visits</u>
1985	631,500
1986	685,600
1987	654,900
1988	651,600

Existing Use and Development

NPS Facilities

The headquarters for the park complex is located in Sedro Woolley, Washington, approximately 50 miles to the west of the boundary of Ross Lake NRA. The NPS and the U.S. Forest Service share office space and operate a joint information station in the same building. A NPS district office at Marblemount serves the Skagit and wilderness districts and provides backcountry information and permits.

Proposed Visitor Center Site

In the general area proposed for the new visitor center / environmental learning center, the NPS has two campgrounds located on opposite sides of the Skagit River. The Goodell Creek Campground has 22 sites and is located on the north side of the Skagit River, south of State Route 20. In addition, there are a total of 17 associated group campsites to the north of State Route 20 on either side of Goodell Creek (see Existing Conditions map p. 7).

The Newhalem Campground was constructed in the late 1970's and lies on the south side of the Skagit River. At present, this campground has 129 sites, but was designed to be expandable to a total of 430 sites. This campground is more intensively developed than the Goodell Creek Campground, yet still provides excellent spacing between campsites.

The town of Newhalem lies approximately 1/4 mile to the east of the Newhalem and Goodell Creek campgrounds. The town was originally constructed in the early 1920's to house employees of Seattle City Light and their families who participated in the construction of the dams on the upper Skagit River. The town is comprised of employee residences, offices, maintenance shops, and various other buildings. For three decades, the only access to the town was by railroad, river, or trail.

With automation of the power plants in the early 1970's, Seattle City Light had a diminishing need to house employees in Newhalem. Several of the old houses have been torn down and additional ones are slated for removal in the future.

The town has a store and a visitor information building which is used to provide general visitor orientation.

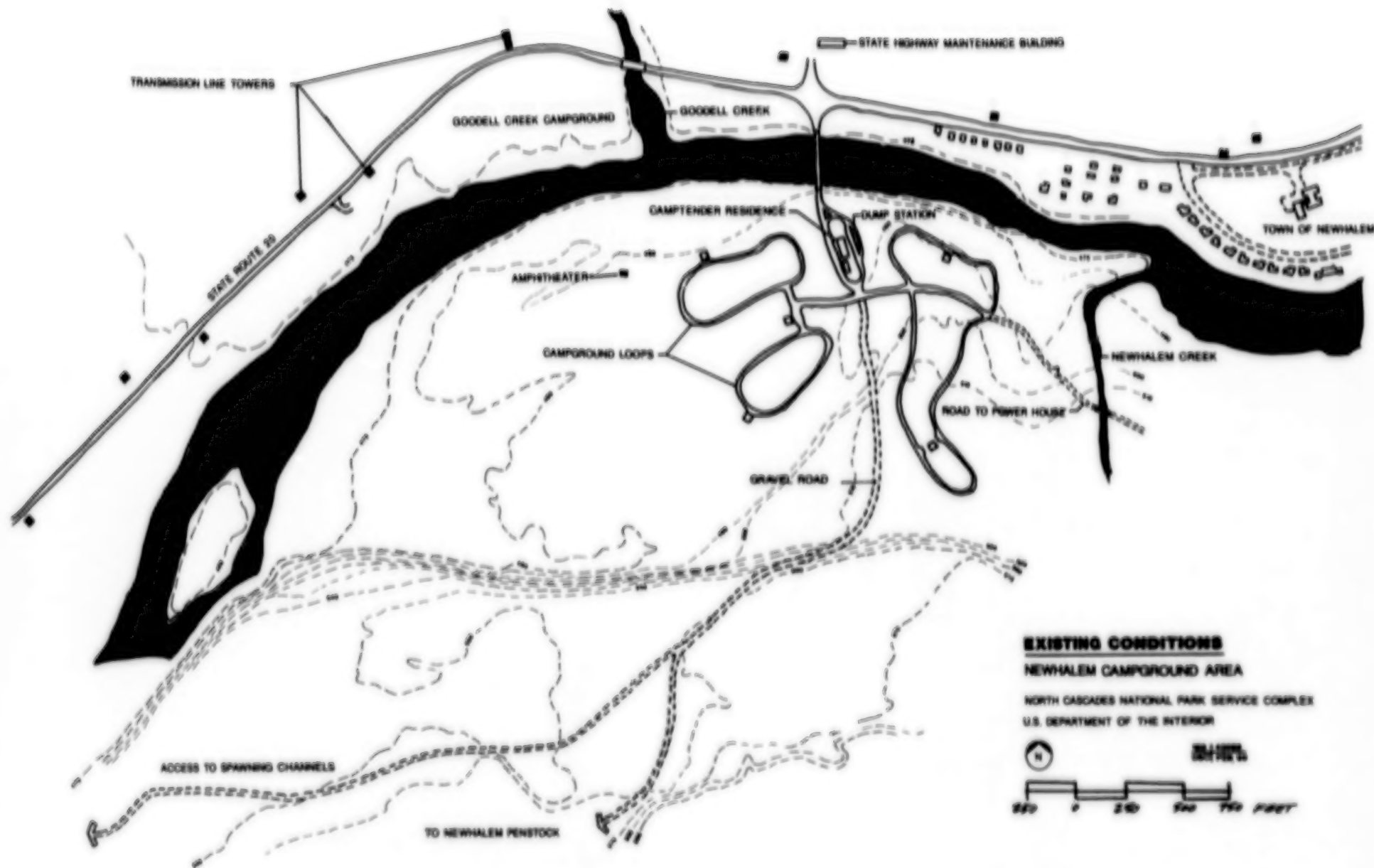
Ross Lake / Happy Flats Overlook

There are presently no facilities located in the immediate area of the proposed overlook. State Route 20 is immediately contiguous with the site. The location is indicated on the Highway Corridor map (p. 5).

Natural Resources

Climate

The western side of the park complex lies predominately in a temperate maritime climate, typified by mild wet winters and cool dryer summers. To the east, the park complex is increasingly influenced by continental air masses that produce warmer and dryer



summers and colder winters. Along the Highway 20 corridor, there is a very noticeable transition of climate as one travels the route.

Proposed Visitor Center Site

The area surrounding Newhalem is characterized by heavy precipitation, cool relatively dry summers, and mild wet winters. Yearly precipitation averages approximately 85 inches (NPS Geographic Information Division, Denver, CO). Snowfall occurs each winter and occasionally can be quite heavy. However, only in rare years will snowfall accumulate and remain all winter.

Typical daytime summer temperatures range from 75 degrees during the day with nighttime lows in the 40's. Winter temperatures are usually in the 40's during the day with nighttime lows occasionally dropping to 10 degrees or lower.

Direct sunshine on the south side of the Skagit River near Newhalem occurs for 9 hours each day during the summer months of May, June, and July. During winter months, there is only about 2 hours of direct sunshine during November, December, and January, and then only on the occasional day that the sky is not overcast from winter storms. Direct sun shines on the north side of the valley for a somewhat longer period of time each day but the duration is also very limited because of the high peaks and ridges to the south of the gorge.

Proposed Ross Lake / Happy Flats Overlook Site

The area near the proposed Ross Lake / Happy Flats overlook is higher in elevation than the Newhalem site and further to the east. As a result, the area experiences colder average winter temperatures with more of the precipitation falling as snow. In a typical year, 4 feet or more of snow accumulates at this site during the winter months. Summer temperatures vary considerably, but are typically cooler than the temperatures at the Newhalem site.

Air Quality

North Cascades National Park was designated a Class I air quality area by the Clean Air Act of 1977. Both National Recreation Areas of the park complex are designated as Class II air quality areas. Air quality within the park is generally excellent. Activities such as campfires and the operation of vehicles and equipment cause temporary minor air quality degradation, but slash burning activities on adjacent National Forest, state, and private lands and air pollution from the Puget Sound urban / industrial complex are the major sources of air pollution in the park. Slash burning in Washington is regulated by the state's Smoke Management Plan which restricts slash burning within 60 miles of Class I areas on weekends between July 1 and Labor Day.

Near the area proposed for the overlook above Ross Lake, the NPS has established a permanent visibility monitoring station to monitor air quality as it affects visibility near Ross Lake.

Hydrology

Originating about 20 miles inside Canada near Hope, British Columbia, the Skagit River drains 400 square miles before it enters Ross Lake National Recreation Area at the international boundary. The river's total drainage area is 1,176 square miles. Three dams associated with Seattle City Light's hydroelectric project have impounded the waters of the Skagit in a string of reservoirs: Gorge Lake, Diablo Lake, and Ross Lake. Gorge Lake, the smallest, has 210 acres of surface area, Diablo Lake has 910, and Ross Lake has 11,680. The primary purpose of the dams is power generation, but the storage capacities of the three reservoirs also aid in downstream flood control.

The Skagit River flows unimpeded for approximately 10 miles below the Newhalem power house to the boundary of Ross Lake National Recreation Area. Near the area of the proposed visitor center, the Skagit River is actively meandering and braiding, forming gravel bars, spits, and shifting islands. The river gradient here is approximately 16 feet per mile.

Historically, the Skagit River flooded its valley during times of heavy runoff. Since August, 1942, the river's discharge has been regulated by upstream dams and floodwaters have been moderated by man.

Topography / Geology / Soils

The most conspicuous aspect of the North Cascades is the abundance of glaciers and the effects of their erosive movements. The area contains the densest concentration of glaciers in the contiguous United States. As the glaciers move, they scour rocks, widen and deepen valleys, and leave behind sharp narrow ridges of solid rock, deep, narrow valleys, and spire-like peaks. The general topographic relief is greater here than in any other locale in the conterminous United States.

The mountains of the North Cascades are composed primarily of various metamorphic rocks -- primarily gneiss and schist. However, different rock types often interfinger together, producing a confusing, complex geologic system. The heterogeneity of the parent material has produced a myriad of soil types. Glacial till and outwash generally occur along the bottoms of all major valleys. These soils are fairly stable, although typically they are excessively well drained.

Proposed Visitor Center Site

The area of the proposed visitor center lies between elevations of 470 and 570 feet in the narrow steep-sided Skagit valley. Oriented roughly east-west, this valley is intersected by secondary valleys entering from the north and south. On all sides, mountain walls rise to over 5,000 feet with peaks in excess of 6,000 feet. The topography at the proposed site consists of large terraces that slope gently toward the Skagit River.

The soils in the area of the proposed visitor center are formed from ancient glacial and alluvial deposits that are quite coarse. The material consists of silt, sands, gravels, cobbles, and boulders, with considerable local variation and sorting (Jones 1974).

Proposed Ross Lake / Happy Flats Overlook Site

The area of the proposed overlook above Ross Lake lies at an elevation of 2240 feet on a north-facing aspect. The site is on a narrow bench approximately 600 feet above the lake. Slopes between the bench and the lake are quite steep with many slope angles exceeding 100 percent. The site provides an unobstructed view to the north up Ross Lake and to the west down the Skagit River valley. Soils are very thin with bedrock exposed in many places.

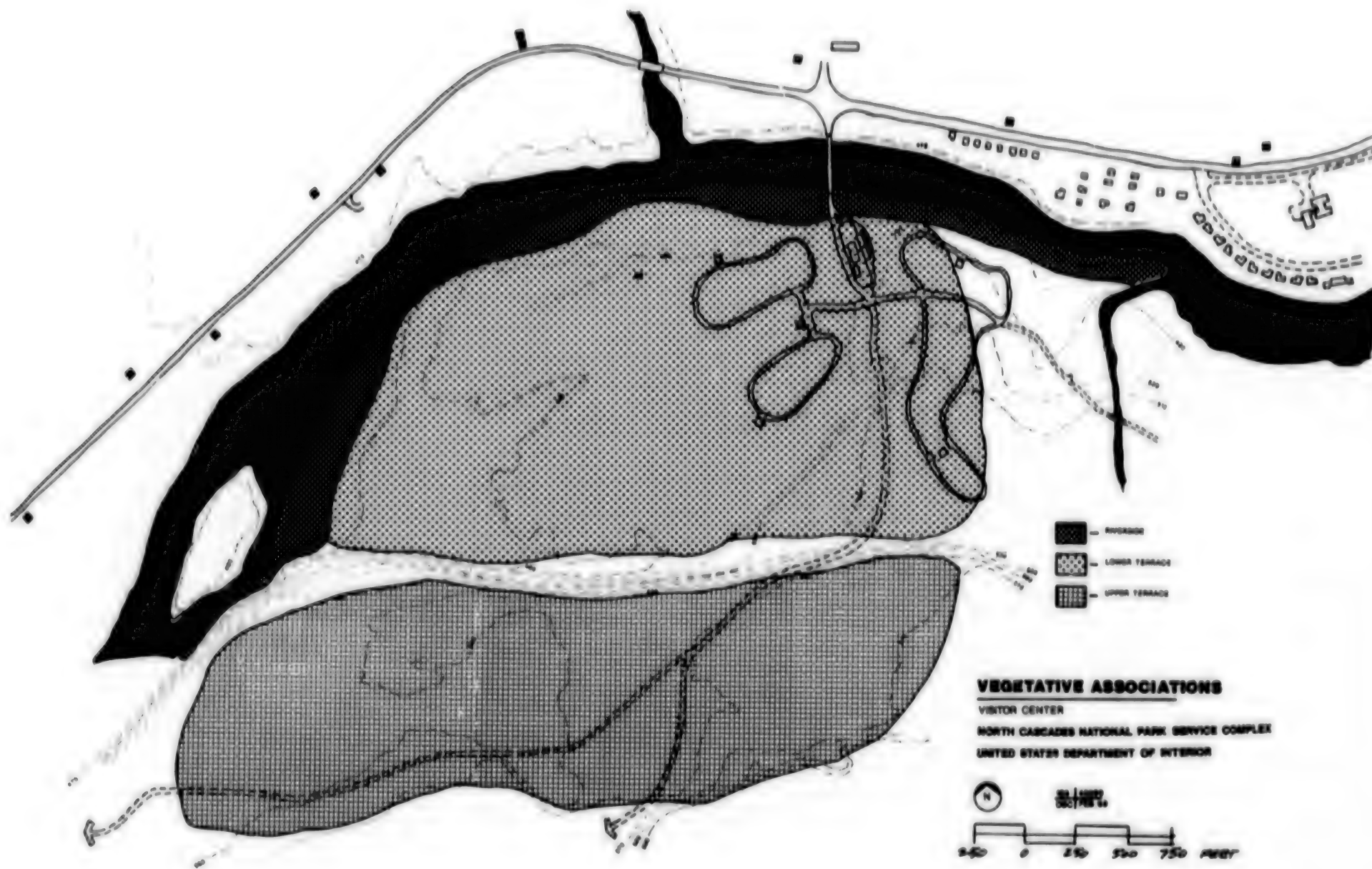
Vegetation

A wide variety of plant communities are contained within the park complex. The dense coniferous forest communities on the west side of the complex, which reflect the generally wet, moderate climate of a maritime region gradually change to an open-canopied forest of ponderosa pine (*Pinus ponderosa*) and Douglas fir (*Pseudotsuga menziesii*) as one moves east to the drier climate of the east side of the Cascades. In addition, there are major differences in vegetation caused by elevation gradients. Higher elevation forests are dominated by subalpine fir (*Abies lasiocarpa*), whitebark pine (*Pinus albicarpa*), and subalpine larch (*Larix laricina*).

The Skagit valley is transitional in character between the typical west-side and east-side vegetation types. Trees requiring moist conditions such as western red cedar (*Thuja plicata*) and western hemlock (*Tsuga heterophylla*) dominate the forest of the lower Skagit. Trees requiring drier or warmer conditions such as Douglas fir, ponderosa pine, and lodgepole pine (*Pinus contorta*) are more prevalent in the upper and eastern portion of the drainage. The greatest concentration of hardwood stands occurs immediately adjacent to the river in its lower reaches.

Proposed Visitor Center Site

The proposed visitor center site lies within the western hemlock zone (Franklin and Dyreness 1973) of western Washington. Dominant tree species include Douglas fir, western hemlock, and western red cedar. Hardwoods are found in recently disturbed sites and along the river.



Three distinct vegetative associations occur in the project area. For descriptive purposes these are delineated as follows: 1) the riverside association, 2) the lower terrace association, and 3) the upper terrace association. (see Vegetative Associations map, p. 10 and Plant List, Appendix A).

The riverside association lies on the banks of the Skagit River between Newhalem Creek and a vegetated island approximately 0.5 miles downriver of Goodell Creek. This forest was selectively thinned in the mid-1950s (Mason, per comm.). The remaining tree cover is dominated by large western red cedar, Douglas fir and western hemlock. Some red alder (*Alnus rubra*) and black cottonwoods (*Populus trichocarpa*) are also present.

The lower terrace is a disturbed area, as evidenced by a fire dating to the early 1920's and logging in the mid-1950's (NPS 1977). The area is dominated by lodgepole pine, with some Douglas fir represented. Understory vegetation is predominantly western hemlock, western red cedar, and vine maple (*Acer circinnatum*) with bracken fern, sword fern, salal (*Gaultheria* sp.), oregon grape (*Berberis nervosa*) and kinnickinnick (*Arctostaphylos uva-ursi*) the most common groundcover.

The western section of the upper terrace has also been logged in the past and is dominated by a deciduous forest that includes red alder, black cottonwood, vine maple, and paper birch (*Betula papyrifera*). East across this terrace, conifers become dominant with Douglas fir, western hemlock, and western red cedar comprising the canopy. The understory consists mainly of regenerating western hemlock and 1 meter high salal. Mosses are conspicuous covering boulders, logs, tree bases, and the forest floor.

The northern section of the upper terrace contains a stand of old-growth forest habitat (See Old Growth map p. 12). While this old-growth stand was selectively logged prior to 1950, it still contains sufficient numbers of old trees, snags, and downed woody debris to be considered old growth. Within the three states of California, Oregon and Washington, there are about 5 million acres of old-growth forest remaining (Franklin et al 1986). Most of this acreage is located in national parks and on land administered by the U.S. Forest Service.

Old-growth forests are of particular concern to biologists as they contain many unique species dependant upon this habitat.

Key attributes of old-growth forest are summarized as follows. These are reported in Interim Definitions for Old-Growth Douglas Fir and Mixed-Conifer Forests in the Pacific Northwest and California (1986) and the Society of American Foresters Report on Scheduling the Harvest of Old-Growth Timber (1984).

Two or (commonly) more tree species with a wide range in tree sizes and ages and often including a long-lived dominant (e.g., Douglas-fir) and a shade-tolerant associate (e.g., western hemlock);

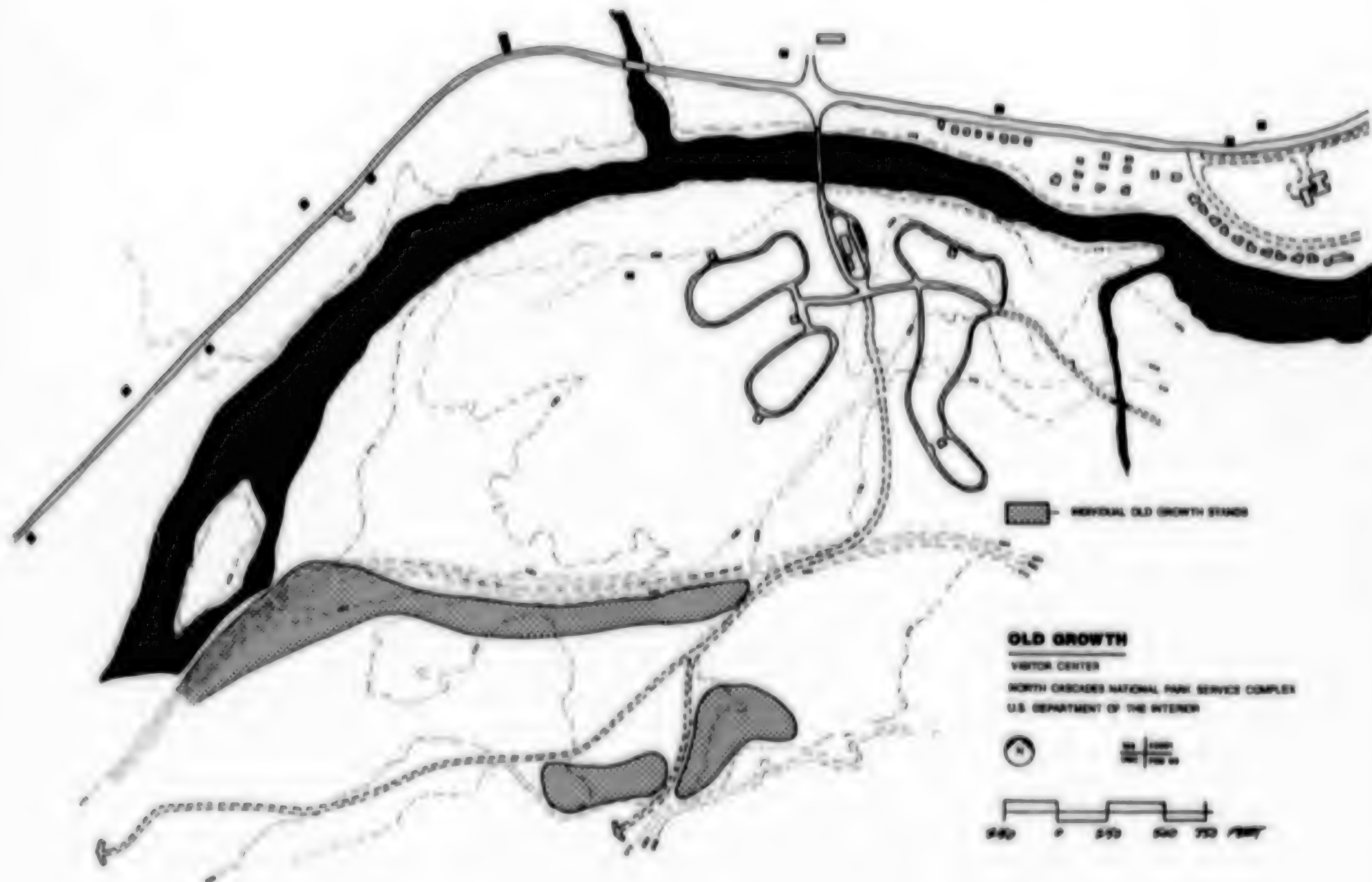
Deep, multilayered crown canopy;

Some individual live trees (8 or more per acre) that are either old (greater than 200 years) or have achieved large size (greater than 32 inches in diameter at breast height);

Significant coarse woody debris including snags (4 or more per acre over 15 feet tall and 20 inches in diameter) and down logs (4 or more per acre greater than 50 feet long totaling 15 or more tons per acre).

Erosional and nutrient losses from old-growth forests are known to be lower than from other successional stages (Swanson, Fredricksen and McCorison 1982; Sollins et al. 1980). The large amounts of detritus, root mass, and woody debris typically restrict ground surface and channel erosion as well as nutrient leaching. Consequently, water quality in streams and rivers associated with old-growth forests is typically high.

Water yields vary with site conditions. In general, old-growth forests have higher leaf areas than young forests, thus higher transpiration losses and lower total water yields might be expected, though they have never been documented. Where clouds or fog are common in old-growth, moisture condensation on crowns may provide substantial moisture additions as fog drip (Harr 1982).



Live trees are often decadent (multiple or dead tops, or rots) and have large branches and deep crowns, all of which contribute to their value as wildlife habitat, particularly for primary cavity excavators such as pileated woodpeckers. Snags have other roles such as in carbon and nutrient cycles.

Proposed Ross Lake / Happy Flats Overlook Site

Lying further to the east than the proposed visitor center site and on very shallow soils, this site is a much dryer and less productive site. Trees grow much slower than those of the more moist valleys to the west. The dominate tree species at the overlook site is lodgepole pine, which occurs in young, fairly dense stands that are 15 to 45 feet tall. Douglas fir replaces lodgepole pine in the more moist areas. The understory is dominated by salal and kinnikinnik.

Threatened and Endangered Plant Species

No plants listed on the U.S. Fish and Wildlife Service Final List of Endangered and Threatened plants (USFWS 1987) have been found in either of the project areas (Naas and Naas, 1988).

The Washington Natural Heritage Program maintains an official list of state endangered, threatened, and sensitive plant species. Approximately 50 species on that list are either known to occur in the park complex or are likely to occur there based on the presence of suitable habitat. During a reconnaissance of the project areas, no plants on the state list were found nor are any of these plants known to exist at either site.

Wildlife

There are an estimated 86 species of mammals, and 28 species and subspecies of fish in the park complex. Bird species are numerous, but the majority are seasonal residents that spend winters elsewhere.

Federally classified species that occur within the park complex include the endangered peregrine falcon and gray wolf, and the threatened grizzly bear and bald eagle. At present, no critical habitat has been

designated for these species, but the status of the grizzly bear and of the gray wolf are under study. There are no known peregrine nests in the complex, but extensive habitat suitable for peregrine breeding exists. During winter and early spring, bald eagles frequent the Skagit River in the area of Newhalem, feasting on dead or dying spawning salmon. The status of bald eagle populations along the Skagit River is monitored by the park and U.S. Forest Service each winter.

Proposed Ross Lake / Happy Flats Overlook Site

Due to the small size of this site, its immediate proximity to S.R. 20, and the homogeneity of habitats (young coniferous forest with sparse understory) it is unlikely that many vertebrate species of wildlife are dependent upon or are more than short-term residents of this site.

There are no known occurrences of state or federally listed threatened or endangered wildlife species at this site. In the general area around Ross Lake, there are recorded occurrences of wolverine, a candidate species for federal listing. Because of their very large range it is unlikely that wolverine are more than occasional migrants through this site.

Proposed Visitor Center Site

Systematic long-term observations of animal populations in the area of the proposed visitor center are lacking. However, a few short-term studies have included the area. Winter bald eagle surveys have been conducted in the area since 1982. T.R. Wahl, N. Lavers, and R. Schmidt assessed the area for wildlife when the Newhalem Campground Environmental Assessment was prepared. North Cascades National Park Wildlife Observation files contain some wildlife observations from 1969 to present. Impacts to anadromous fish populations have been addressed from Seattle City Light project assessments along the upper Skagit River.

There are 6 federal and/or state listed endangered, threatened, or sensitive wildlife species that are either known or assumed to utilize the habitat of the proposed visitor center site (Table 1.). Of these

species, only bald eagles and pileated woodpeckers are confirmed users of this area.

Appendixes B & C contain lists of all mammals, birds, herpetofauna and fish known or suspected to utilize the habitat in the area of the proposed visitor center.

Table 1
Endangered, Threatened, and Sensitive Wildlife
Possibly Utilizing the Habitat
in the Area of the Proposed Visitor Center

<u>Birds</u>	<u>Federal Status</u>	<u>State Status</u>
Northern goshawk	-	S
Bald eagle	T	T
Pileated woodpecker	-	S
Northern spotted owl	-	E
<u>Mammals</u>		
Fisher*	-	S
Grizzly bear*	T	E
Codes:	E = Endangered T = Threatened S = Sensitive	

* not known to be present, but habitat is suitable

Bald eagles are known to feed during winter months along the Skagit River in the vicinity of Newhalem Campground. However, from reconnaissance surveys completed in the winter of 1988-89, bald eagles do not appear to be more than occasional visitors to the area above the river that is proposed for the visitor center, parking lot, and environmental learning center.

There are no candidate wildlife species under review for consideration as federally endangered or threatened that are known to utilize habitat in the area of this site. The U.S. Fish and Wildlife Service recently recommended that the northern spotted owl be listed as a threatened species. Although this species inhabits some of the old-growth stands within the park complex, it is not known to be present in the area of the proposed visitor center. In September, 1988, the National Park Service attempted calling for the spotted owl and received no response. Calling was again initiated on April 17, 1989, but no responding spotted owls were noted. Preliminary contact has been made with the Fish and Wildlife Service should Section 7 procedures of the Endangered Species Act be required.

Fishery

The upper Skagit River in the area of the proposed visitor center provides important spawning and rearing habitat for a number of anadromous species such as Dolly Varden char, summer and winter steelhead, and chinook, pink, and coho salmon. Resident species include rainbow trout, mountain whitefish, gulpin and sucker.

Cultural Resources

Historic Resources

There are no structures listed or proposed for listing on the National Register of Historic Places in either of the proposed construction sites.

Archaeological Resources

Indirect archaeological evidence suggests that prehistoric people used portions of the park complex for at least 8,000 years. It is predicted that hundreds of unrecorded archaeological sites exist inside the park complex boundaries. Much of the knowledge of park archaeological resources has been gained from the few known archaeological sites located within the park, studies of archaeological remains from numerous locations outside the park, theoretical models of hunter-

gatherer adaptations, ethnographic descriptions of Northwest Indian groups, and reconstructions of prehistoric Northwest environmental changes.

One hundred thirty-five archeological sites are known to exist in the park complex. Since only 1 percent of the park lands have been surveyed for archeological resources, it is likely that hundreds more exist. The heavy maritime vegetation at lower elevations, which were favorite locations for the larger village-type sites, make discovery difficult and time consuming.

Proposed Visitor Center Site

Nine archeological sites have been located within the vicinity of the Newhalem developed area. Three of these are located on the banks of the Skagit River and probably represent more recent occupations associated with the procurement of riverine resources. One of these sites is straddled by the existing bridge crossing the Skagit River accessing the Newhalem Campground. This site was test excavated in 1978 and was found to consist of sparse cultural remains of undetermined age. Site deposits were considered not significant. Any structural changes made to the existing bridge have a high potential to disturb this site. The other two sites are on the north side of the river and are far from any development proposed for this project.

The Newhalem Rock Shelter site is located on the east side of Newhalem Creek and is also far from any proposed development.

Five prehistoric archeological sites have been located on a high Pleistocene terrace where the visitor center and environmental learning center are proposed. These sites are buried and have no surface manifestation. They are covered with a thin volcanic ash of unknown origin that is probably less than 500 years old.

Four of these five sites are within the proposed project boundaries. Of these four, two have been assessed as not significant and the other two are likely to qualify for inclusion in the National Register of Historic Places. Only a portion of one of the not significant sites would be affected by the proposed construction. The two significant sites would be unaltered and avoided by project plans. These latter

two sites contain a relatively rare tool technology for the preparation of specialized blades. Artifacts recovered during test excavation have included microblades and microblade cores, suggesting an early and highly significant resource. Its location above the flood plain further suggests an early date, when the Skagit River was higher and its channel cut along the north edge of the terrace.

Proposed Ross Lake / Happy Flats Overlook

There are no known archeological sites located in the vicinity of the proposed overlook. Reconnaissance surveys completed in the vicinity in past years have found no archeological remains. The site's small size and location on a steep hillside make it unlikely that prehistoric people were more than occasional visitors to the site.

ALTERNATIVES

Several alternatives have been considered for constructing the proposed visitor center and overlook. It is beyond the scope of this document to describe all elements of each alternative considered; however, some are included in the "Alternative Locations Considered But Rejected" section. From the numerous alternatives considered, preferred alternatives have been identified based upon environmental impacts, cost-effectiveness, visitor safety, aesthetic qualities, and visitor enjoyment.

Common Elements and Mitigating Measures of the Preferred Alternatives

The following section applies to both preferred alternatives (proposed visitor center and the proposed Ross Lake / Happy Flats overlook).

An approved borrow source for surfacing, subgrade fill, and loose aggregate materials would be provided by the contractor outside the park complex.

A batch plant for mixing asphalt would also be outside the park complex. Paving activities can take place only when daytime temperatures average 55 degrees Fahrenheit or higher, therefore limiting paving to the warmer, snow-free months of May - October.

To minimize unnecessary environmental impacts, construction would be restricted to the minimum area required. In areas with sensitive resources such as large trees or stream banks increased attention would be required to protect these resources from mechanical damage from equipment, erosion, siltation or other impairment with the potential to adversely affect these resources.

In constructing sewage leach fields, special care and attention would be required by the contractor to minimize damage to tree roots. In many cases hand digging will be required to supplement mechanical excavation when working around trees. Leach fields will not require clearing of all trees adjacent to the leach lines.

In some areas it would be necessary to remove hazardous trees to facilitate public safety. Selection of trees to be removed along the road corridor and in the area of the parking lots and buildings would be considered on an individual basis by the NPS. The NPS would designate a person to monitor tree removal during construction. This person would be responsible for minimizing damage to adjacent trees.

In fill areas adjacent to the road or parking lot, care would be taken to assure that more than one half of the existing root zone of any tree near the toe of the fill slope remain at the existing grade. If more than one half of the existing root zone is covered by fill, either the tree would be removed or the fill removed from around the tree. Each tree in the toe slope of any fill would be evaluated individually by the NPS to assure that impacts to the old-growth forest would be minimized.

The NPS will complete their spotted owl survey in the spring of 1989. Should spotted owls be found to be nesting and rearing young in the immediate area of construction, and, in the opinion of the U.S. Fish and Wildlife Service and the NPS, would be adversely affected by construction activities, all work would be halted until the young birds are fully fledged.

Felled trees would be used by the park for construction material or firewood. Other trees not suitable for that use would be disposed of outside of the park complex by the contractor.

A disturbed area vegetation plan would be formulated by the NPS. Specifications regarding soil preparation, native seed mixes, fertilizer, mulching, etc. would be provided for all areas disturbed by construction activities. The revegetation plan would strive to utilize transplants as much as possible.

During excavation, existing vegetation, excepting trees, would be removed with the topsoil in a single cut. This procedure eliminates the need for separate grubbing and topsoil removal. This material would be used later in the revegetation of the disturbed ground. Special attention by the contractor would be required to return topsoil-vegetation mixtures to the approximate location where the mixtures were removed.

All material removed would be stockpiled near the disturbed area. Contamination of this topsoil and plant mixture with subsoil, asphalt, aggregate, or other material would be avoided. Topsoil would not be used for any purpose such as bedding material or general fill. No topsoil would be stockpiled for longer than 2 months before being used to cover disturbed ground.

After final grading the topsoil-vegetation mixture would be spread across the disturbed area starting at the most visible edge. The material would be worked and spread using a backhoe or other equipment. Topsoil would be the final soil layer and must not be spread thinner than 2 inches deep. In areas where there is not sufficient topsoil, existing topsoil would be feathered toward the least visible edge of the slope.

In the event that topsoil stockpiles are insufficient to cover disturbed areas, additional topsoil would be obtained from outside the park complex. All topsoil brought into the park complex would be inspected for non-native vegetation and its origin by the NPS before being spread. The NPS would reject any soil found to contain non-native vegetation or originating from a location with significant amounts of non-native vegetation. If no suitable topsoil source is found outside the park complex, sterilized topsoil would be used.

Where any of the work of this proposed project is adjacent to naturally occurring creeks, streams or the Skagit River, no fill would be permitted to enter the water course. In addition, no channel modification or channel relocation would be permitted in any stream or watercourse.

If, during construction, archeological remains are discovered, work would be halted until the significance of the finding can be determined by NPS cultural resources staff. If protection in place is not feasible, the mitigation of adverse impacts to those resources would be developed in consultation with the Washington State Historic Preservation Officer and the Advisory Council on Historic Preservation.

During construction, the NPS would have a project supervisor on-site reviewing the work to assure that the work conforms with the design

objectives for North Cascades and to assure that the work methods minimize impacts to the land adjacent to the construction area.

VISITOR CENTER / ENVIRONMENTAL LEARNING CENTER

Alternative A - Construct a New Visitor Center / Environmental Learning Center South of the Newhalem Campground (Preferred)

A new visitor center would be constructed to the south of the existing Newhalem Campground and of the Skagit River approximately 1/3 mile from State Route 20. The site is on a terrace approximately 80 feet in elevation above the river (see map following page). The visitor center would have a 120 car parking lot, concrete walkways, and a series of interconnecting trails.

Although the final proposed design is not yet complete, the visitor center would be approximately 7,000 square feet in area and would have interpretive media, an information desk, restroom facilities, and an auditorium. The building would be sited near the edge of the upper terrace to provide views of the southern Picket Range in the headwaters of Goodell Creek. A trail system would link the campground with the visitor center and provide a network of interpretive trails.

A 120-car parking lot would be constructed proximate to the visitor center that would provide parking for automobiles, buses, and recreational vehicles.

The access road from Newhalem Campground to the visitor center would utilize the present alignment of the existing gravel road that is used by Seattle City Light to get to the upper end of the penstock of the hydroelectric plant on Newhalem Creek. The new access road would be paved, 20 to 22 feet in total width, with 2 to 3 foot unpaved shoulders. In most places, this road template will fit on the existing road prism and will involve only minor cuts into the excavated slopes.

The utility lines (water, electricity, and phone) would be buried under the new access road prior to surfacing. A 75,000 gallon water tank would be constructed above the visitor center approximately 1/4 mile up the penstock access road to provide additional water pressure and volume. Pipes to the water tank would be buried beneath the existing penstock road.

Sewage treatment would be accomplished using septic tanks and leach fields located adjacent to the visitor center site.

The work would begin in the fall of 1989 or the spring of 1990. The access road and utility system would be completed first, followed by the construction of the visitor center and parking lots.

Although not associated with the initial construction, in the future an environmental learning center would be constructed west of the visitor center and parking lot. Associated with the environmental learning center would be a kitchen facility, a restroom / shower facility, and approximately 4 cabin-type dormitories to house up to 40 learning center participants.

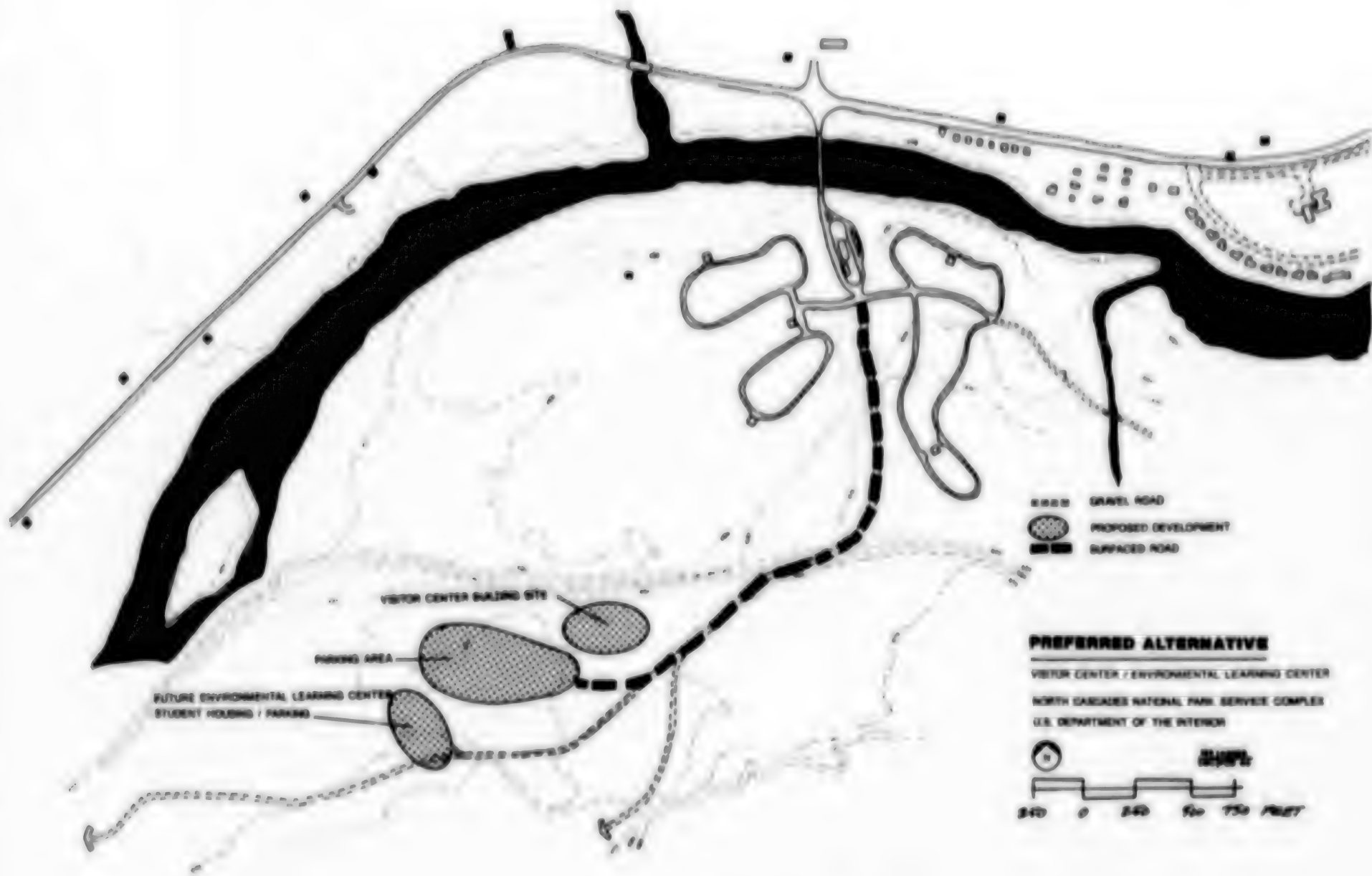
Alternative B - No Action

Under this alternative no new visitor center or environmental learning center would be built. The site above Newhalem Campground has been proposed for the construction of additional campsites should future additional campsites be needed in the park complex. Additional campground loops may be built if the visitor center / environmental learning center is not constructed at this site.

Access Alternative Considered But Rejected

During the preliminary design, an access route to the proposed visitor center was considered that would have intersected State Route 20 approximately 1/2 mile to the west of the Newhalem Campground access road. This would have allowed separate entrances for both the Newhalem Campground and the proposed visitor center, thereby reducing congestion and visitor confusion along both access routes.

This design option would have required the construction of an additional bridge crossing the Skagit River below the Goodell Creek campground. In addition, it would involve constructing approximately 2800 feet of road through largely undisturbed terrain.



Because of environmental and safety concerns, this alternative was eliminated from further consideration. The primary concerns are listed below:

1. Significant numbers of anadromous fish (several species of salmon and steelhead) utilize the area of the Skagit immediately below its confluence with Goodell Creek for spawning. It is almost certain that this area of the river is also utilized by resident fish species for spawning and rearing of fry. The construction of a bridge in this area could adversely affect these fish species and possibly permanently alter the river's gravel substrate making it less suitable for spawning and rearing.
2. Because of the presence of spawning salmon, bald eagles frequent the area of the Skagit below Goodell Creek during the late fall and winter months. The construction and presence of a new bridge and the resulting increased vehicular and human traffic over the Skagit River could adversely affect this species. Bald eagles are listed as threatened in Washington State under the Endangered Species Act.
3. Goodell Creek Campground is a primary put-in point for recreational boaters on the Skagit River. The placement of a bridge with in-stream supports immediately below the boater put-in could present a safety hazard to some boaters.
4. The construction of 2800 feet of access road that would be necessary between the bridge and the proposed visitor center would permanently impact approximately 3 acres of presently undisturbed ground.

Alternative Locations Considered But Rejected

Within the park complex, several alternative locations for a visitor center / environmental learning center were considered but were rejected during the preliminary review stages of this project. There are very few sites suitable for significant development along the Highway 20 Corridor within the park complex boundaries. The

constraints include a general lack of utilities, steep slopes, flood zones, and access difficulties. The alternative locations that were considered included: 1) the Goodell Creek site; 2) the Newhalem Townsite; 3) the Diablo Overlook site; and 4) the Thunder Mountain site (see Alternative Sites map p. 21)

The Goodell Creek site was indicated by the North Cascades General Management Plan as the preferred location for a visitor center. The site is located to the west of Goodell Creek, approximately 1/4 mile to the north of State Route 20. This site has good views of mountainous terrain and excellent access to and from State Route 20. However, the site is located entirely on the alluvial fan of Goodell Creek. Further investigation of the flood potential of the creek and its associated hazards eliminated this site from consideration.

Goodell Creek shows evidence of major past flood events that could have seriously damaged a permanent structure such as the proposed visitor center. While the flood hazard might have been mitigated by channel modifications and bank hardening, the NPS determined that the fiscal and environmental costs of the mitigation did not warrant further consideration of this site.

The Newhalem Town site was rejected for several reasons: 1) any site in the town of Newhalem would not have a view of the interior mountains of the park complex; 2) any site would probably be too small to accommodate the necessary functions of the visitor center and environmental learning center; and 3) the highly modified landscape of the town accompanied with the dominating presence of the high tension power lines overhead would not expose the visitor to the environment of the North Cascades that the park was established to provide.

The Diablo Overlook Site is located high above Diablo Lake to the north of State Route 20. The site was rejected from further consideration because the site was too small to accommodate the functions of the visitor center and environmental learning center. In addition, the cost of providing utilities and sewage disposal would be prohibitive.

The Thunder Mountain site is located on a small knoll above Thunder Arm of Diablo Lake to the west of State Route 20 near Colonial Creek Campground. The site was rejected because of the limited space available for facilities, the significant visual scarring that would occur in order to gain access to the site, and the high cost of providing utilities and sewage disposal to the site.

ROSS LAKE / HAPPY FLATS OVERLOOK

Alternative A - Construct an Overlook, Parking Area, and Interpretive Display Near Happy Flat (Preferred)

A 20- to 35-car parking lot, short boardwalk, and restrooms would be constructed adjacent to Highway 20 just to the east of Happy Flat (see site plan p. 23). The area for the parking lot and walks would be graded and surfaced to provide level parking and handicapped access to the boardwalk, restrooms, and interpretive displays.

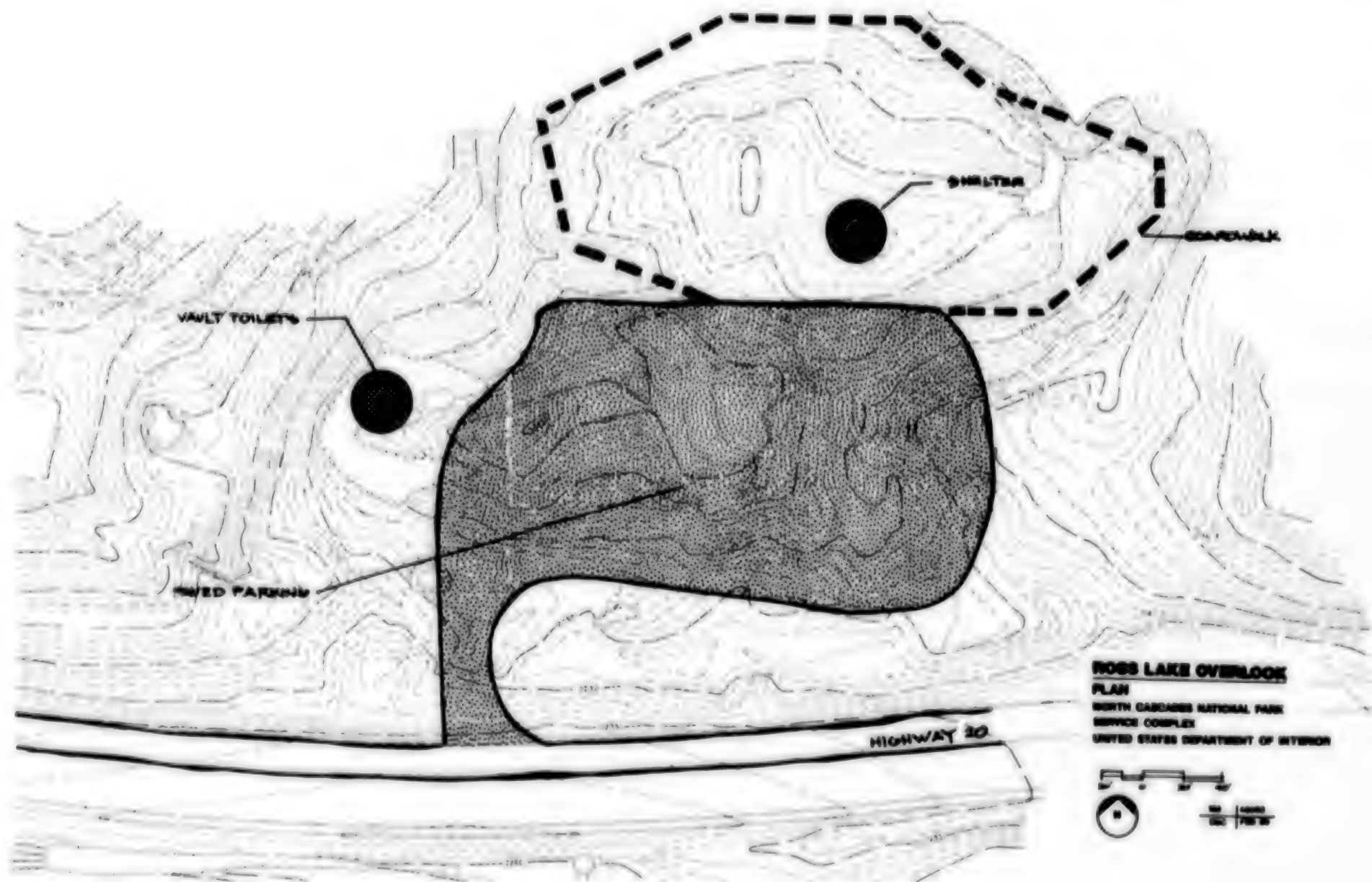
The boardwalk trail would be approximately 0.1 mile in length and would be handicap accessible. The surface would be elevated above the ground to eliminate grading and impacts associated with blasting the bedrock which is at or very close to the surface for most of the route proposed for the trail.

The restrooms would be a sealed vault or composting design which would eliminate the need for on-site effluent disposal. The vaults would be pumped periodically and the sewage transported to a sewage treatment facility.

Some type of interpretive media (kiosk, interpretive panels, signs) would be placed on-site to distribute information about the resources and facilities of the park as well as to interpret the views and resources in the immediate area.

Alternative B - No Action

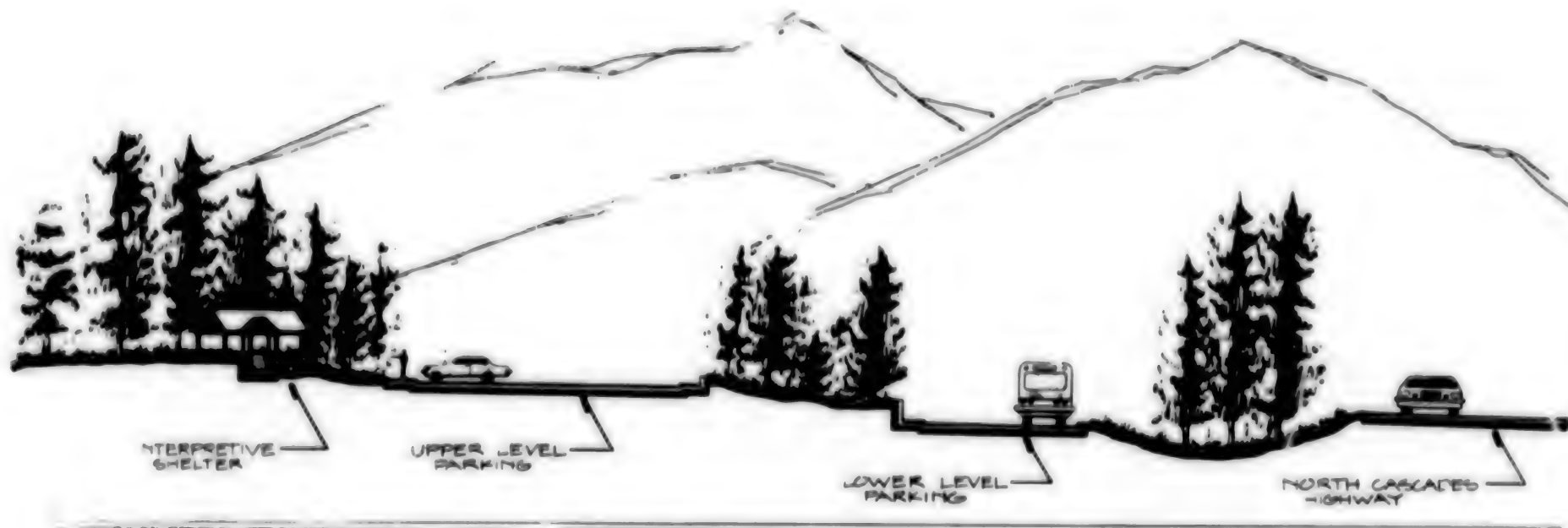
Under this alternative no overlook, parking area, or interpretive display would be constructed.



ROSS LAKE OVERLOOK
PLAN
NORTH CASCADES NATIONAL PARK
SERVICE COMPLEX
UNITED STATES DEPARTMENT OF INTERIOR



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**ROSS LAKE OVERLOOK
PROFILE**

NORTH CASCADES NATIONAL PARK SERVICE COMPLEX
UNITED STATES DEPARTMENT OF INTERIOR

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ENVIRONMENTAL CONSEQUENCES

There would be some impacts on natural and cultural resources, visitor use, park staff, and the local economy because of construction activities. Specific impacts are discussed below, and general impacts are addressed in the subsequent section.

DIRECT IMPACTS

Impacts to Natural Resources

Proposed Visitor Center / Environmental Learning Center

Alternative A - Construct a New Visitor Center / Environmental Learning Center South of the Newhalem Campground (Preferred)

A total of approximately 7.8 acres of undisturbed or minimally disturbed land would be directly impacted by this alternative. The impacts would range from complete vegetation removal and light excavation, grading and surfacing, to selective tree cutting for vista improvement and hazard tree removal.

Of this total of 7.8 acres, approximately 3.2 acres of land that is presently undisturbed or minimally disturbed would be paved or otherwise surfaced; 0.4 acres of undisturbed land would be covered with buildings or water tanks; an additional 4.2 acres of land would be impacted by the construction of trails, leach fields, utility corridors, and buffer zones around buildings to reduce hazards to the public and structures from fire and falling trees. The following tables provide an estimate of the trees to be removed for this alternative.

In addition to the above impacts, approximately 1.4 acres (between 2,000 and 2,500 lineal feet) of existing gravel road would be regraded and surfaced with asphalt.

This alternative would impact approximately 2.0 acres of old-growth forest to the extent that it would no longer correspond with the definition of old growth developed by the Old Growth Definition Task Group presented earlier (p. 11). These impacts would primarily be

Table 2

Trees to be Removed for Construction of Parking Lots and Roads

<u>By Size Class</u>		<u>By Species</u>	
<u>Size (dbh)</u>	<u>Number</u>	<u>Species</u>	<u>% of Total</u>
8-15"	965	Western hemlock	50%
16-24"	120	W. red cedar	13%
25-30"	22	paper birch	14%
31-40"	22	Douglas fir	11%
		snags	5%
Total	1129	red alder	5%

Table 3

Trees to be Removed for Construction of Buildings

<u>By Size Class</u>		<u>By Species</u>	
<u>Size (dbh)</u>	<u>Number</u>	<u>Species</u>	<u>% of Total</u>
8-15"	48	Western hemlock	43%
16-24"	52	W. red cedar	29%
25-30"	21	Douglas fir	17%
31-40"	21	snags	9%
		other	2%
Total	142		

*Dead standing trees

from hazard tree and fuel reduction around the buildings, parking lots, and walkways (the Hazard Tree Management Plan is on file at park headquarters and available for review). Approximately 20 - 40 live trees and snags with average diameters of 22 inches would be initially removed from the old-growth stand during construction. Ongoing hazard tree removal would be expected to remove additional trees from the stand in the years following construction.

Implementing this alternative would have no direct or indirect impacts to wetlands, floodplains, or fisheries.

Alternative B - No Action

No impacts would occur.

Proposed Ross Lake / Happy Flat Overlook

Alternative A - Construct an Overlook, Parking Area, and Interpretive Display Near Happy Flat (Preferred)

Implementing this alternative would impact approximately 1.8 acres of undisturbed or minimally disturbed land. Of this total, approximately .66 acres would be covered with asphalt, approximately 0.01 acres covered with structures (restroom and kiosk), approximately 0.1 acres covered with boardwalk, and approximately 0.93 acres impacted by fills and grading. (see site plan, p. 23).

Alternative B - No Action

No impacts would occur.

GENERAL IMPACTS

Natural Resources

The following apply to all action alternatives discussed above.

Machinery emissions and increased airborne dust resulting from construction activities would decrease air quality in the vicinity of the project sites. Impacts on air quality would be temporary; normal conditions would return once construction was completed.

Noise and human presence associated with construction activities would disturb wildlife in the immediate vicinity of the project sites. Mammal and bird species would be expected to avoid these areas to a certain extent during construction and some permanent wildlife displacement would occur. The effect on overall populations of affected species would not be significant.

Other adverse impacts on wildlife would be associated with alterations of habitats due to removal or replacement of existing vegetation in areas surrounding facility development. The specific acreage that would be affected is included in the specific discussion of impacts for the alternative. The total affected acreage would be small; therefore, the NPS anticipates no long term significant impact on wildlife.

There would be no known adverse impact on any federally proposed or listed threatened or endangered animal or plant species under any alternative considered (U.S. Fish and Wildlife Service, 1988).

Based on the best information currently available, these areas provide habitat that may be of use to grizzly bears. These areas are part of a five-year Interagency Habitat Evaluation effort to determine the status of the grizzly bear in the North Cascades and the role, if any, this ecosystem plays in the recovery of this species.

The study will provide information about suitable habitat, grizzly bear occurrences, and seasonal use of habitat. Results are anticipated by 1990. This EA includes no specific conservation measures that must be implemented at the time of construction to reduce project-related impacts to grizzly bears. However, based on the outcome of the study, or new information as it becomes available, additional measures may be required to further the conservation of the species.

Therefore, based on the best information currently available, the project will not adversely affect the grizzly bear, grizzly bear habitat, or the National Park Service's ability to implement a recovery plan.

The removal of large snags and old mature trees for site clearance and hazard tree mitigation would reduce the use of these areas by pileated woodpeckers and spotted owls; however, due to the large territorial range of these species (in excess of 20 acres per breeding pair for pileated woodpeckers and greater than 1000 acres per breeding pair for spotted owls), the impacts should not adversely affect the populations of either of these species. Calling for spotted owls will be done at least 5 more times this spring before a final determination is made that this project will have no impact to individual spotted owls that may be in the area.

The sites appears to be marginal goshawk habitat, therefore this species should not be adversely affected.

Fishers and wolverines tend to have very large ranges and thus should not be adversely affected by the small amount of disturbance contemplated in these alternatives.

Bald eagles do not appear to utilize the specific area of the proposed construction; however, the presence of additional humans in the area around Newhalem may have some minor effects on individual birds feeding or roosting along the river. This project would have no effect on the eagles' primary food stocks or foraging areas. The construction activities will be distant from the river and therefore should not disturb the eagles or cause their avoidance of roosting or feeding sites. The cumulative effect of additional human presence upon bald eagles along the Skagit River due to this proposed action is not expected to be significant.

Cultural Resources

An archeological survey is underway to determine if any archeological sites would be affected by the construction activities. An archeological clearance will be obtained prior to construction.

The densest concentration of archeological remains are apparently outside the immediate area proposed for the visitor center development. A testing program is currently on-going to determine the horizontal extent of the archeological site and its significance prior

to its nomination to the National Register of Historic Places. The information from the testing program would be used to avoid impacts to the site during the design and construction of the visitor center and parking lots. If protection is not feasible, mitigative procedures would be developed in consultation with the State Historic Preservation Office and the Advisory Council on Historic Preservation.

No other properties either listed or proposed for listing on the National Register of Historic Places would be adversely affected by either preferred alternative.

Visitor Use, Park Staff, and Local Economy

During construction activities, visitors in the vicinity of the project sites would be subject to noises, smells, and visual intrusions associated with heavy machinery and road construction. The most significant disturbance would be in concentrated visitor use areas around Newhalem Campground and State Route 20 in the vicinity of the proposed overlook. Visitor use generally received by Newhalem Campground would be expected to temporarily shift to other areas. This might increase visitor use pressure at other campgrounds not involved in construction.

Local economic benefits could be expected from construction labor hired and from services provided to construction employees.

Once completed, the visitor center, environmental learning center, and the overlook / interpretive display will provide a central location for providing information, interpretation, and education about the North Cascades and the recreational opportunities along the State Route 20 corridor. This would provide many more visitors than at present the information and knowledge they need to take full advantage of what their park has to offer.

Appendix A

Plant Species in the Area of the Proposed Visitor Center

Trees:

Douglas fir
Western hemlock
Western red cedar
Pacific silver fir
Pacific dogwood
Pacific yew
Vine maple
Black Cottonwood
Red alder
Mountain ash
Big-leaf maple
Paper birch
Cascara buckthorn
Willow spp.

Shrubs:

Salei
Red huckleberry
Evergreen huckleberry
White azalea
Rock azalea
Oregon grape
Kinnickinnick
Devil's club
Salmonberry
Thimbleberry
Pacific blackberry

Pseudotsuga menziesii
Tsuga heterophylla
Thuja plicata
Abies amabilis
Cornus menziesii
Taxus brevifolia
Acer circinnatum
Populus trichocarpa
Alnus rubra
Sorbus scopulina
Acer macrophyllum
Betula papyrifera
Rhamnus purshiana
Salix spp.

Gaultheria shallon
Vaccinium parviflorum
Vaccinium ovatum
Rhododendron albiflorum
Menziesia ferruginea
Berberis nervosa
Arctostaphylos uva-ursi
Oxycoccus horridum
Rubus spectabilis
Rubus parviflorus
Rubus ursinus

Herbs:

Pearly-everlasting
Rattlesnake plantain
Prince's pine
Twin flower
Starflower
Bracken fern
Licorice fern
Paralely fern
Maidenhair fern
Lettuce
Bedstraw
Bunchberry
Self-heal
Rauwolfia
Queen's cup
St. Johnswort
Miner's lettuce
Pathfinder
Goatsbeard
Pinedrops
Indian pipe

Mosses:

Anaphalis margaritacea
Oenothera oblongifolia
Chimaphila menziesii
Limonium boreale
Trientalis latifolia
Paridium aquilinum
Polypodium glycyrrhiza
Cryptogramma crispum
Adiantum pedatum
Lactuca spp.
Oxalis spp.
Cornus canadensis
Prunella vulgaris
Aster spp.
Claytonia uniflora
Hieracium umbellatum
Monda perfoliata
Adenocaulon bicolor
Aruncus dioica
Parosponia andromeda
Monotropa uniflora

Hylacomium splendens
Rhyidiadelphus loreus
Eurhynchium oregonum

Appendix B

Bird Species Known or Suspected to Utilize Habitat in the Area of the Proposed Visitor Center

	Upper Terrace	Lower Terrace	River		Upper Terrace	Lower Terrace	River
Common merganser	U*	C*	C	Golden-crowned kinglet	C	C	C
Sharp-shinned hawk	U	C	U	Ruby-crowned kinglet	U	C	C
Cooper's hawk	U	C	U	Townsend's solitaire	C		
Northern goshawk		U		Veery			C
Osprey			C	Bushtit		C	C
Bald eagle		C	C	Hermit thrush	C		
Red-tailed hawk	C	U		American robin	C	C	C
Blue grouse	C	C	C	Varied thrush	C	C	C
Spotted sandpiper		C	C	Cedar waxwing	C	U	C
Glaucous-winged gull			C	European starling		U	C
Band-tailed pigeon	U	C	C	Red-eyed vireo		C	C
Western screech-owl		U		Warbling vireo	U	U	U
Great horned owl		U		Orange-crowned warbler	C	U	C
Northern pygmy-owl	U	U		Yellow warbler	C		U
Barred owl	C	U		Yellow-rumped warbler	C	U	U
Northern saw-whet owl			U	Black-throated gray warbler	C	U	C
Black swift	C	C	C	Townsend's warbler	C	U	C
Vaux's swift	C	C	C	MacGillivray's warbler	U	C	C
Rufous hummingbird	C	C	C	Wilson's warbler	U	U	C
Belted kingfisher			C	Western tanager	U	U	U
Hairy woodpecker	C	U		Black-headed grosbeak	U	U	C
Common flicker	C	U	U	Rufous-sided towhee			C
Pileated woodpecker	C	C		Chipping sparrow		U	
Olive-sided flycatcher		U		Fox sparrow	C	U	
Western wood-pewee	U	U		Song sparrow		C	C
Willow flycatcher		U	C	White-crowned sparrow	U	U	C
Hammond's flycatcher	U	C	U	Dark-eyed junco	C	C	C
Western kingbird			C	Brown-headed cowbird	C	C	C
Eastern kingbird			C	Purple finch	U	U	U
Tree swallow		U	C	Red crossbill	C	C	U
Violet-green swallow		U	C	Pine siskin	C	C	C
Northern rough-winged swallow		U	C	American goldfinch			C
Barn swallow		C	C	Evening grosbeak	U	U	U
Steller's jay	C	C	C				
Common crow	C	C	C				
Common raven	C	C	C				
Chestnut-backed chickadee	C	C	C				
Red-breasted nuthatch	C	C	U				
Brown creeper	C	C	U				
Winter wren	C	C	U				
American dipper			C				

*C = confirmed, verified sight record

U = unconfirmed, assumed to occur, no verified sight record

Appendix C

Mammals, Herpetofauna, and Fish Known or Suspected to Utilize Habitat in the Area of the Proposed Visitor Center

Mammals

Opposum
Vagrant shrew
Trombridge's shrew
Shrew-mole
Little brown bat
Snowshoe hare
Townsend's chipmunk
Douglas squirrel
Northern flying
squirrel
Deermouse
Bushy-tailed woodrat
Gapper's red-backed
vole
Porcupine
Coyote

Didelphis marsupialis
Sorex vagrans
Sorex trombridgii
Neurotrichus gibbii
Myotis lucifugus
Lepus americanus
Eutamias townsendii
Tamiasciurus douglasii

Glaucomyia sabrinus
Peromyscus maniculatus
Neotoma cinerea

Clethrionomys gapperi
Erethizon dorsatum
Canis latrans

Red fox
Grizzly bear
Black bear
Raccoon
Marten
Fisher
Ermine
Long-tailed weasel
Mink
Wolverine
River otter
Mountain lion
Bobcat
Black-tailed deer

Vulpes vulpes
Ursus arctos
Ursus americanus
Procyon lotor
Martes americana
Martes pennsylvanicus
Muscula erminea
Muscula frenata
Muscula vison
Oulo luscus
Lutra canadensis
Felis concolor
Felis rufus
Odocoileus hemionus

Reptiles

Northern alligator
lizard
Rubber boa
Western terrestrial
garter snake
Common garter snake

Elgaria coerulea
Charina boiae

Thamnophis elegans
Thamnophis sirtalis

Herpetofauna

Amphibians

Northwestern
salamander
Roughskin newt
Western toad
Pacific treefrog
Red-legged frog

Ambystoma gracile
Taricha granulosa
Bufo boreas
Hyla regilla
Rana aurora

Fish

Pink salmon
Chum salmon
Coho salmon
Chinook salmon
Mountain whitefish

Oncorhynchus gorbuscha
O. tshawytscha
O. kisutch
O. tshawytscha
Prosopium williamsi

Rainbow/Steelhead
trout
Dolly Varden
Bull trout

Oncorhynchus mykiss
Salvelinus malinus
Salvelinus confluentus

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PREPARERS AND CONSULTANTS

PREPARERS

James Hammett, Natural Resource Specialist, Denver Service Center
Robert Kuntz, Biological Technician, North Cascades National Park

CONSULTANTS

Jon Jarvis, Chief of Resource Management, North Cascades National Park (NOCA)
Bob Wasem, Management Biologist, NOCA
Gary Mason, Natural Resource Specialist, NOCA
Bill Laitner, Chief of Interpretation, NOCA
Jonathan Bjorkland, Biological Technician, NOCA
Jim Harris, Park Ranger, NOCA
Bob Mierendorf, Archeologist, Pacific Northwest Region (PNRO)
Edger P. Menning, Natural Resource Specialist, PNRO

Shirley Clark, Environmental Compliance Officer, PNRO
Ed Nieto, Architect, Denver Service Center
Bob Welch, Landscape Architect, Denver Service Center
Mike Reynolds, Geographic Information System Division, NPS,
Denver, CO
Palmer Jenkins, NPS, Geographic Information System Division, NPS,
Denver CO
Cathy Blee, Archeologist, Denver Service Center
Frank Williss, Historian, Denver Service Center
Rich Inglis, Water Resources Division, NPS, Fort Collins, CO
James Michaels, Section 7 Biologist, U.S. Fish and Wildlife Service,
Olympia, Washington

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National Park Service
Denver Service Center
P.O. Box 25287
Denver, CO 80225-0287

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